UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/681,771	06/02/2001	Eric D. Brill	MCS-004-01	7610

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EXAMINER
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ART UNIT	PAPER NUMBER
2178	

DATE MAILED: 02/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/681,771	BRILL ET AL.
	Examiner	**Art Unit**	
	Kyle R Stork	2178	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _10 December 2004_.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1 and 3-27_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1 and 3-27_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1.   This office action is in response to the amendment filed 10 December 2004.

2.   In the amendment, claim 2 has been cancelled. Claims 24-27 have been added.

Claims 1 and 3-27 are pending. The rejection of claims 1, 3-23 under 35 U.S.C. 103(a)

as being unpatentable over the previous combinations of Mogilevsky (US 5787451),

Ristad et al. (Learning String Edit Distance), Bernth et al. (US 2002/0087604), Walfish

et al. (US 6047300), Ishikawa (US 5812863), and Gilai et al. (US 6018736) has been

withdrawn as necessitated by the amendment. The rejection of claims 11-23 under 35

U.S.C. 102(a) as being unpatentable over Brill et al. (An Improved Error Model for Noisy

Channel Spelling Correction, 2000) has been withdrawn as necessitated by the

amendment.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4.   Claims 1, 3-10, 25, and 27 are rejected under 35 U.S.C. 102(a) as being

anticipated by Brill et al. (An Improved Error Model for Noisy Channel Spelling

Correction, 2000, hereafter Brill).

As per independent claim 1, Brill discloses a method for spelling correction of a

phrasal string comprising:

- Segmenting the phrasal string into a plurality of different segmentations (page 3, paragraphs 2-6: Here, the word phrasal strings physical and fisikle are segment into different segmentations)

- Using dictionary looping to spell correct each of the plurality of different segmentations (pages 4-5, section "Applying the Model": Here dictionary looping is described (specifically on page 5, paragraph 2))

- Determining a cost associated with each of the plurality of different segmentations (pages 4-5, section "Applying the Model": Here, the cost is the distance)

- Identifying segmentations having a lowest cost corresponding to a most probable correct spelling of the phrasal string (page 2, section "An Improved Error Model": Here, the lowest cost (minimum number of insertions, substitutions, and deletions) are identified)

As per dependent claim 3, Brill discloses the method wherein dictionary looping further comprises comparing each of the plurality of different segmentations with entries in a phrasal dictionary (pages 4-5, section "Applying the Model": Here, a dictionary D is compiled into a trie of corresponding vectors and weights).

As per dependent claim 4, Brill discloses the method wherein the dictionary is capable of containing phrasal strings including phrases, words, and spaces (page 1, section "Noisy Channel Spelling Correction," paragraph 1: Here, the dictionary contains string elements of Σ^*, which, by definition, contains all possible combination of characters, including phrases, words, and spaces).

As per dependent claim 5, Brill discloses the method wherein the cost is a cost of correcting each of the plurality of different segmentations (pages 3-4, section "Training the Model": Here, the cost is the same is minimizing the edit distance through the number of edits necessary).

As per dependent claim 6, Brill discloses the method wherein each of the plurality of different segmentations includes contiguous sub-strings over the phrasal string (page 2-4, sections "An Improved Error Model" and "Training the Model": Here, the physical fisikle example of segmentation is disclosed. Further, an example using actual and akgsual is also segmented).

As per dependent claim 7, Brill discloses the method further comprising spell correcting sub-strings of a segmentation using dictionary looping (pages 4-5, section "Applying the Model").

As per dependent claim 8, Brill discloses the method wherein dictionary looping further comprises performing a looping search through a phrasal dictionary to compare each of the sub-strings with entries in the phrasal dictionary to find an entry having a closest match (pages 4-5, section "Applying the Model").

As per dependent claim 9, Brill discloses the method further comprising construction a corrected segmentation using the closest match for each of the sub-strings (pages 3-5, sections "Training the Model" and "Applying the Model").

As per dependent claim 10, Brill discloses the computer readable medium containing computer-executable instructions for performing the process of claim 1 (page

5, column 2: Here, it is disclosed that the process is carried out on a Dell 610 500mhz, Pentium III workstation).

As per independent claim 25, Brill discloses the method for spelling correction of a misspelled phrasal string containing words, spaces, and characters, comprising:

- Dividing the misspelled phrasal string into a plurality of different segmentations containing sub-strings (page 3, paragraphs 2-6: Here, the word phrasal strings physical and fisikle are segment into different segmentations)

- Performing dictionary looping of a trie containing a phrasal dictionary to search for each of the sub-strings in the trie (pages 4-5, section "Applying the Model": Here dictionary looping through the use of tries is described (specifically on page 5, paragraph 2))

- Comparing each of the sub-strings to entries in the trie to find a closest match to the sub-string (page 2, section "An Improved Error Model": Here, the lowest cost (minimum number of insertions, substitutions, and deletions) are identified)

- Constructing a corrected phrasal string using the closest sub-string trie matches (pages 5-7, section "Results": Here, the system returned several possible spelling correction suggestions, with the lowest cost being the first choice presented)

As per dependent claim 27, Brill discloses the method further comprising dividing the misspelled phrasal string into all possible segmentations (pages 4-5, section "Applying the Model": Here, all possible combination of phrasal strings to the right and

left of a given phrasal string are stored in tries used to determine the most probable

correction).

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 11-24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Brill in further view of Birman et al. (US 6616704, application 2000, hereafter

Birman).

As per independent claim 11, Brill discloses a method for spelling correction of a

misspelled phrasal string containing words, spaces, and characters, comprising:

- Receiving the misspelled phrasal string (page 3, paragraphs 2-6: Here, the word

  phrasal string fisikle is a misspelled phrasal string. It is further divided into

  phrasal strings f-i-s-i-k-le)

- Dividing the phrasal string into a plurality of segmentations (page 3, paragraphs

  2-6: Here, the word phrasal strings physical and fisikle are segment into different

  segmentations)

- Comparing each of the plurality of segmentations to entries in a dictionary (pages

  4-5, section "Applying the Model": Here dictionary looping is described

(specifically on page 5, paragraph 2). Dictionary looping includes comparing

segmented entries to a dictionary)

- Determining a best segmentation from the plurality of segmentations that

    represent the most probably correct spelling of the misspelled phrasal string

    (page 2, section "An Improved Error Model": Here, the lowest cost (minimum

    number of insertions, substitutions, and deletions) are identified)

Brill further discloses sub-string not restricted to a single word (page 3, paragraphs 2-6:

Here, fisikle is segmented into pieces that are each less than one word in length).

However, Brill does not disclose the method wherein the phrasal string contains a

plurality of words. However, Birman discloses the method wherein the phrasal string

contains a plurality of words (column 2, lines 54-67: Here, a phrasal string that contains

more than one word is spell checked through looping through the phrase until each

word has been corrected).

It would have been obvious to one of ordinary skill in the art at the time of the

applicant's invention to have combined Brill's method of spelling correction through

segmentation into phrasal strings with Birman's method for spelling correction of a

phrasal string containing a plurality of words, since it would have allowed a user to spell

check an entire document instead of spell checking a single word.

As per dependent claim 12, Brill and Birman disclose the limitations similar to

those in claim 11 and the same rejection is incorporated herein. Brill further discloses

the method wherein each of the plurality of segmentations contains contiguous sub-

strings (page 3, paragraphs 2-6: Here, the word phrasal string fisikle is a misspelled

phrasal string. It is further divided into phrasal strings f-i-s-i-k-le. These segmentations are contiguous).

As per dependent claim 13, Brill and Birman disclose the limitation similar to those in claim 12, and the same rejection is incorporated herein. Brill further discloses the method wherein comparing each of the plurality of segmentations to entries in a dictionary is performed by finding a closest match between sub-strings of a segmentation and a dictionary entry (pages 3-5, sections "Training the Model" and "Applying the Model": Here, on page 4, the number of edits necessary to correct a misspelling to the correct spelling is used to determine the "closest match" to a sub-string. Further, on page 5, the number of edits necessary for correction, edit distance, is used in conjunction with a dictionary trie to determine the "closest match").

As per dependent claim 14, Brill and Birman disclose the limitations similar to those in claim 11, and the same rejection is incorporated herein. Brill further discloses the method further comprising determining a cost associated with each segmentation (pages 3-4, section "Training the Model": Here, on page 4, the number of edits necessary to correct a misspelling to the correct spelling is used to determine the cost of correcting a sub-string segmentation).

As per dependent claim 15, Brill and Birman disclose the limitations similar to those in claim 14, and the same rejection is incorporated herein. Brill further discloses the method wherein the best segmentation is a segmentation having a lowest cost (page 2, section "An Improved Error Model": Here, the minimum distance between the two strings in used).

As per dependent claim 16, Brill and Birman disclose the limitations similar to those in claim 14, and the same rejection is incorporated herein. Brill further discloses the method wherein hierarchical parameters are used to determine the cost associated with each segmentation (pages 3-4, section "Applying the Model": Here, a hierarchical tries are used to represent data on the left and right sides of a substitution. The tries are used to determine the edits necessary for correction).

As per dependent claim 17, Brill and Birman disclose the limitations similar to those in claim 16, and the same rejection is incorporated herein. Brill further discloses the method wherein hierarchical parameters include at least one of: (a) a length of a dictionary entry; (b) a probability of a dictionary entry given a context of neighboring words in the phrasal string (pages 3-4, section "Applying the Model": Here, a hierarchical tries are used to represent data on the left and right sides of a substitution. The tries are used to determine the edits necessary for correction. By determining the edits necessary for correction, the probability of determining the correct word is determined).

As per independent claim 18, Brill discloses a phrasal spelling correction system for spelling correction of a phrasal string, comprising:

- A segmentation module that divides the phrasal string into a plurality of segmentations, each of the plurality of segmentations containing sub-strings (page 3, paragraphs 2-6: Here, the word phrasal strings physical and fisikle are segment into different segmentations)

- A looping comparator that performs dictionary looping to correct a segmentation by looping through a dictionary and comparing each of the sub-strings of the segmentation with entries in the dictionary to determine a closest match (pages 4-5, section "Applying the Model": Here dictionary looping is described (specifically on page 5, paragraph 2))

- An output string containing a corrected segmentation having a lowest cost that represents a correct spelling of the phrasal string (pages 5-7, section "Results": Here, the system returned several possible spelling correction suggestions, with the lowest cost being the first choice presented)

Brill further discloses sub-string not restricted to a single word (page 3, paragraphs 2-6: Here, fisikle is segmented into pieces that are each less than one word in length). However, Brill does not disclose the method wherein the phrasal string contains a plurality of words. However, Birman discloses the method wherein the phrasal string contains a plurality of words (column 2, lines 54-67: Here, a phrasal string that contains more than one word is spell checked through looping through the phrase until each word has been corrected).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have combined Brill's method of spelling correction through segmentation into phrasal strings with Birman's method for spelling correction of a phrasal string containing a plurality of words, since it would have allowed a user to spell check an entire document instead of spell checking a single word.

As per dependent claim 19, the applicant discloses the limitations similar to those in claim 14. Claim 19 is similarly rejected under Brill and Birman.

As per dependent claim 20, the applicant discloses the limitations similar to those in claim 16. Claim 20 is similarly rejected under Brill and Birman.

As per dependent claim 21, the applicant discloses the limitations similar to those in claim 17. Claim 21 is similarly rejected under Brill and Birman.

As per dependent claim 22, the applicant discloses the limitations similar to those in claim 4. Claim 22 is similarly rejected under Brill in view of Birman.

As per dependent claim 23, Brill and Birman disclose the limitations similar to those in claim 22, and the same rejection is incorporated herein. Brill further discloses the method further comprising a dynamic update module that provides dynamic updating of phrasal string dictionary updates (page 2, column 2: Here, words that are not in the dictionary but are not more than one edit away are used to update the dictionary but adjusting the probabilities of specific corrections).

As per independent claim 24, Brill discloses the method of spelling correction of a phrasal string comprising:

- Segmenting the phrasal string into a plurality of different segmentations containing substrings (page 3, paragraphs 2-6: Here, the word phrasal strings physical and fisikle are segment into different segmentations)

- Using dictionary looping to perform a plurality of different searches through a dictionary data structure such that each of the different searches begins at a starting node and continually loops back to the starting node to begin another

search in order to compare each of the sub-strings with entries in the dictionary

data structure (pages 4-5, section "Applying the Model": Here dictionary looping

is described (specifically on page 5, paragraph 2). Further, since all possible

combination of the left hand and right hand sides of a possible correction are

generated in trie form, upon completion of one trace through the trie, a second

trace would be required to start from the starting node. This node tracing would

continue looping back to the starting node and tracing through the possibilities

until all possible combination were traced to determine each probability that a

change is correct)

- Determining a cost for correction associated with each of the plurality of different

  segmentations (pages 4-5, section "Applying the Model": Here, the cost is the

  distance)

- Identifying a segmentation having a lowest cost of correction corresponding to a

  most probably correct spelling of the phrasal string (page 2, section "An

  Improved Error Model": Here, the lowest cost (minimum number of insertions,

  substitutions, and deletions) are identified)

Brill further discloses sub-string not restricted to a single word (page 3, paragraphs 2-6:

Here, fisikle is segmented into pieces that are each less than one word in length).

However, Brill does not disclose the method wherein the phrasal string contains a

plurality of words. However, Birman discloses the method wherein the phrasal string

contains a plurality of words (column 2, lines 54-67: Here, a phrasal string that contains

more than one word is spell checked through looping through the phrase until each word has been corrected).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have combined Brill's method of spelling correction through segmentation into phrasal strings with Birman's method for spelling correction of a phrasal string containing a plurality of words, since it would have allowed a user to spell check an entire document instead of spell checking a single word.

As per dependent claim 26, Brill discloses the limitations similar to those in claim 25, and the same rejection is incorporated herein. Brill further discloses sub-string not restricted to a single word (page 3, paragraphs 2-6: Here, fisikle is segmented into pieces that are each less than one word in length). However, Brill does not disclose the method wherein the phrasal string contains a plurality of words. However, Birman discloses the method wherein the phrasal string contains a plurality of words (column 2, lines 54-67: Here, a phrasal string that contains more than one word is spell checked through looping through the phrase until each word has been corrected).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have combined Brill's method of spelling correction through segmentation into phrasal strings with Birman's method for spelling correction of a phrasal string containing a plurality of words, since it would have allowed a user to spell check an entire document instead of spell checking a single word.

Response to Arguments

7.   Applicant's arguments filed 10 December 2004 with respect to the rejection of

claims 1-10 under 35 U.S.C. 102(a) as being unpatentable over Brill have been fully

considered but they are not persuasive.

The applicant argues that Brill fails to disclose dictionary looping. However,

dictionary looping as disclosed by the applicant comprises the end node of a trie

pointing back to the root node (paragraph 0062). However, Brill discloses having a trie

representing the possible phrasal strings to the left of an error and similarly, the phrasal

strings to the right of an error in a second trie. When the left hand trie has been

traversed to its end, a point is followed to a corresponding node in the right hand trie

that traces up the tree to the start node. This looping through the possibilities continues

until all of the possibilities have been exhausted. This is necessary to determine the

probability of each path being the corrected phrasal string (pages 4-5, section "Applying

the Model").

The applicant further argues that Brill fails to disclose dividing a misspelled

phrasal string into a plurality of segmentations not containing sub-strings not restricted

to a single word. However, Brill's phrasal strings do not contain sub-strings restricted to

a single word. Brill discloses a possible segmentation for the misspelling of the word

physical as fisikle. Here, fisikle is segmented into the phrasal strings f-i-s-i-k-le, with

each sub-string not a single word. However, the examiner agrees with the applicant's

argument that Brill performs partitioning on a single word, however, the amended claim

limitations do not disclose the requirement that the sub-string be comprised of a plurality

of words.

8.   Applicant's arguments with respect to claims 11-23 have been considered but are

moot in view of the new ground(s) of rejection.

As detailed above, the Birman reference has been incorporated into the rejection

in order to address the claimed features of the amendments.

Conclusion

9.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

- Bernth et al. (US 2002/0087604): Discloses spellchecking over a plurality of

   words.

- Kleene Star (free-defintion.com): Discloses that Σ^* contains the set of all

   characters including the empty set through an infinitely long string of characters.

- String (free-definition.com): Discloses that a string contains a set of characters.

- ASCII (free-definition.com): Discloses that the ASCII character set is commonly

   used by computers and contains the "space" character (page 5).

10.   Applicant's amendment necessitated the new ground(s) of rejection presented in

this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37

CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Kyle R Stork whose telephone number is (571) 272-

4130. The examiner can normally be reached on Monday-Friday (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Stephen Hong can be reached on (703) 308-5465. The fax phone number

for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

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